

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: NEO-RAY

Report Number: P915814

Luminaire Tested: DFN2DIP-4P3F0-020D020US930-FLLFLL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P915814  
REPORT IS A COMBINATION OF REPORTS P899029 AND P895917  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-4P3F0-020D020US930-FLLFLL  
Description: 3 foot, 90deg - 4way Define Geo, with Direct Frosted Lens, Indirect Frosted Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

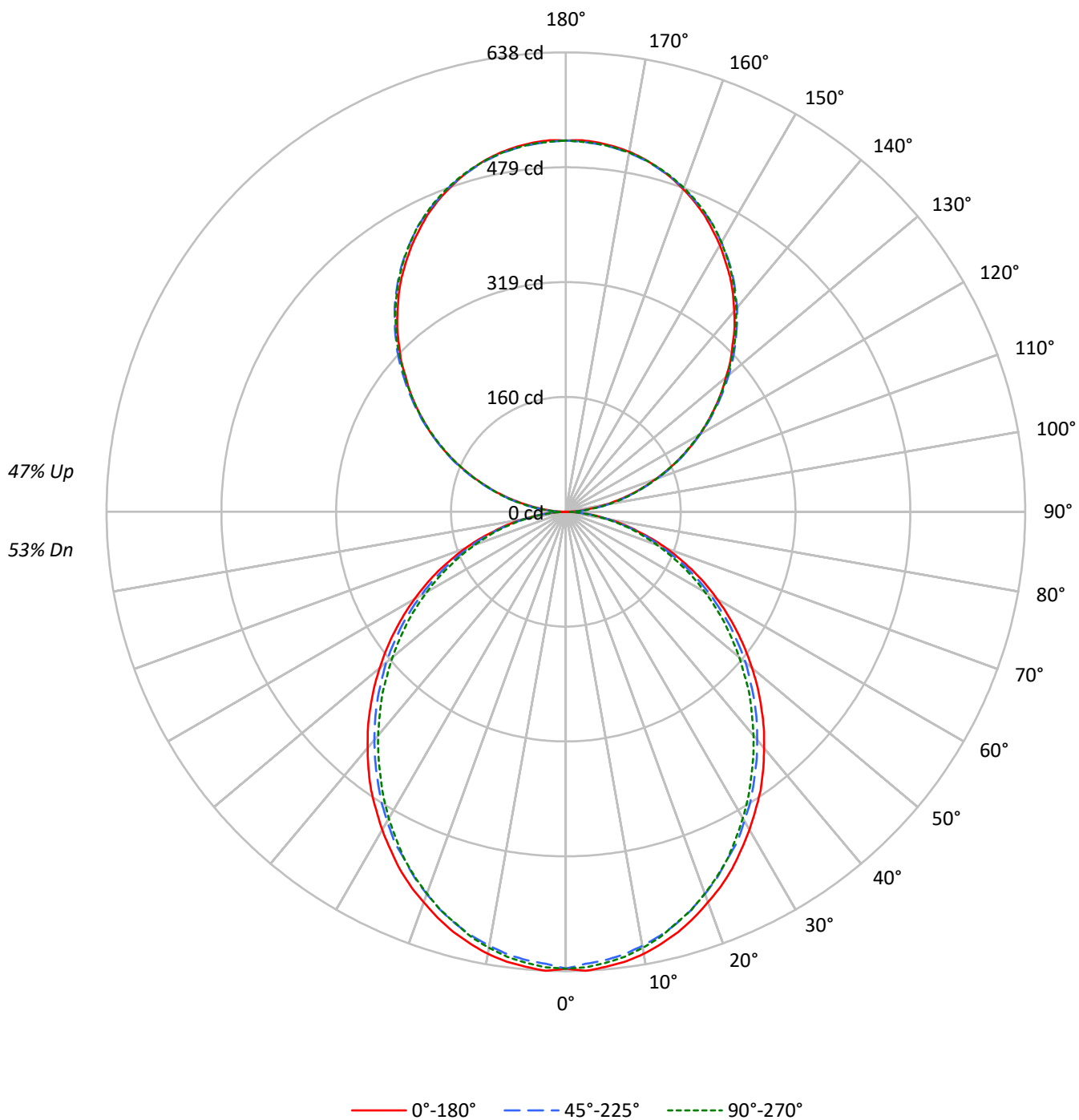
Lumens per Lamp: N/A  
Luminaire Lumens: 3057.4 lumens  
Efficiency: N/A  
Efficacy: 98.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.07' x L: 3.07' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 31  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9951  
Total Harmonic Distortion (THDi): 0.07  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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### Luminous Intensity Polar Plot



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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     | 50 |    |    |    | 30 |    |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
| 0   | 108 | 108 | 108 | 108 | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 71 | 71 | 71 | 59 | 59 | 59 |
| 1   | 98  | 94  | 90  | 87  | 91  | 87  | 84  | 81  | 74 | 72 | 70 | 63 | 61 | 59 | 52 | 51 | 50 |
| 2   | 90  | 82  | 76  | 71  | 83  | 76  | 71  | 66  | 65 | 61 | 58 | 55 | 52 | 50 | 46 | 44 | 42 |
| 3   | 82  | 72  | 65  | 59  | 75  | 67  | 61  | 55  | 58 | 53 | 49 | 49 | 45 | 42 | 41 | 38 | 36 |
| 4   | 75  | 64  | 56  | 50  | 69  | 60  | 52  | 47  | 51 | 46 | 41 | 43 | 39 | 36 | 36 | 33 | 31 |
| 5   | 69  | 57  | 49  | 43  | 63  | 53  | 46  | 40  | 46 | 40 | 36 | 39 | 35 | 31 | 33 | 29 | 27 |
| 6   | 63  | 51  | 43  | 37  | 58  | 48  | 40  | 35  | 41 | 36 | 31 | 35 | 31 | 27 | 30 | 26 | 24 |
| 7   | 59  | 46  | 38  | 33  | 54  | 43  | 36  | 31  | 37 | 32 | 28 | 32 | 28 | 24 | 27 | 24 | 21 |
| 8   | 54  | 42  | 34  | 29  | 50  | 39  | 32  | 27  | 34 | 29 | 24 | 29 | 25 | 22 | 25 | 21 | 19 |
| 9   | 51  | 38  | 31  | 26  | 47  | 36  | 29  | 24  | 31 | 26 | 22 | 27 | 23 | 19 | 23 | 20 | 17 |
| 10  | 47  | 35  | 28  | 23  | 44  | 33  | 26  | 22  | 29 | 23 | 20 | 25 | 21 | 18 | 21 | 18 | 15 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°  | 45° | 90° |
|-----|-----|-----|-----|
| 0°  | 723 | 723 | 723 |
| 5°  | 724 | 712 | 718 |
| 10° | 717 | 702 | 708 |
| 15° | 706 | 690 | 692 |
| 20° | 692 | 674 | 676 |
| 25° | 677 | 654 | 658 |
| 30° | 659 | 636 | 635 |
| 35° | 642 | 614 | 611 |
| 40° | 620 | 592 | 587 |
| 45° | 599 | 571 | 564 |
| 50° | 576 | 548 | 536 |
| 55° | 551 | 521 | 511 |
| 60° | 524 | 490 | 482 |
| 65° | 494 | 457 | 448 |
| 70° | 455 | 417 | 411 |
| 75° | 402 | 369 | 376 |
| 80° | 339 | 308 | 311 |
| 85° | 237 | 204 | 204 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 599 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 59.7   | 2.0       |
| 10°-20°   | 168.0  | 5.5       |
| 20°-30°   | 246.9  | 8.1       |
| 30°-40°   | 286.8  | 9.4       |
| 40°-50°   | 286.4  | 9.4       |
| 50°-60°   | 249.7  | 8.2       |
| 60°-70°   | 184.6  | 6.0       |
| 70°-80°   | 104.5  | 3.4       |
| 80°-90°   | 29.0   | 1.0       |
| 90°-100°  | 31.9   | 1.0       |
| 100°-110° | 101.4  | 3.3       |
| 110°-120° | 173.5  | 5.7       |
| 120°-130° | 228.2  | 7.5       |
| 130°-140° | 256.1  | 8.4       |
| 140°-150° | 251.2  | 8.2       |
| 150°-160° | 210.7  | 6.9       |
| 160°-170° | 139.7  | 4.6       |
| 170°-180° | 48.8   | 1.6       |
| 0°-30°    | 474.7  | 15.5      |
| 0°-40°    | 761.5  | 24.9      |
| 0°-60°    | 1297.6 | 42.4      |
| 0°-90°    | 1615.8 | 52.8      |
| 90°-120°  | 306.8  | 10.0      |
| 90°-150°  | 1042.3 | 34.1      |
| 90°-180°  | 1442.0 | 47.2      |
| 0°-180°   | 3057.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|------|-----|-------|-----|-------|-----|------|
| 0°   | 634 | 634   | 634 | 634   | 634 |      |
| 5°   | 634 | 632   | 625 | 630   | 629 | 60   |
| 15°  | 604 | 600   | 592 | 595   | 592 | 170  |
| 25°  | 547 | 542   | 531 | 533   | 531 | 252  |
| 35°  | 472 | 466   | 456 | 452   | 449 | 295  |
| 45°  | 384 | 380   | 370 | 364   | 361 | 296  |
| 55°  | 290 | 287   | 279 | 272   | 269 | 260  |
| 65°  | 196 | 192   | 186 | 181   | 178 | 194  |
| 75°  | 102 | 101   | 98  | 95    | 96  | 109  |
| 85°  | 25  | 24    | 24  | 22    | 21  | 28   |
| 90°  | 0   | 6     | 15  | 14    | 15  | 3    |
| 95°  | 23  | 27    | 28  | 28    | 27  | 25   |
| 105° | 94  | 95    | 96  | 96    | 96  | 99   |
| 115° | 174 | 177   | 176 | 175   | 174 | 172  |
| 125° | 253 | 257   | 256 | 254   | 254 | 226  |
| 135° | 328 | 332   | 333 | 333   | 332 | 253  |
| 145° | 398 | 401   | 403 | 404   | 402 | 248  |
| 155° | 455 | 456   | 457 | 460   | 458 | 209  |
| 165° | 495 | 494   | 494 | 497   | 495 | 140  |
| 175° | 515 | 514   | 513 | 516   | 513 | 49   |
| 180° | 516 | 516   | 516 | 516   | 516 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 0°     | 634.5 | 634.5 | 634.5 | 634.5 | 634.5 |
| 2.5°   | 638.1 | 635.1 | 628.4 | 634.5 | 633.3 |
| 5°     | 634.5 | 632.1 | 625.3 | 630.2 | 629.0 |
| 7.5°   | 630.2 | 626.6 | 619.9 | 624.8 | 623.5 |
| 10°    | 623.5 | 619.3 | 612.0 | 616.8 | 615.0 |
| 12.5°  | 614.3 | 610.7 | 603.4 | 606.4 | 605.2 |
| 15°    | 604.0 | 600.4 | 592.4 | 594.8 | 591.8 |
| 17.5°  | 591.2 | 587.6 | 579.6 | 582.6 | 579.6 |
| 20°    | 577.1 | 573.5 | 564.9 | 566.8 | 564.3 |
| 22.5°  | 563.1 | 557.7 | 549.7 | 549.7 | 548.5 |
| 25°    | 546.7 | 541.8 | 531.4 | 532.6 | 531.4 |
| 27.5°  | 528.3 | 524.1 | 516.2 | 514.4 | 511.3 |
| 30°    | 510.1 | 505.2 | 496.0 | 494.2 | 491.7 |
| 32.5°  | 490.5 | 486.9 | 477.1 | 473.4 | 471.0 |
| 35°    | 471.7 | 465.5 | 455.8 | 452.1 | 449.0 |
| 37.5°  | 450.3 | 444.7 | 435.0 | 430.7 | 427.6 |
| 40°    | 428.3 | 423.4 | 413.6 | 408.2 | 405.7 |
| 42.5°  | 406.9 | 402.0 | 392.3 | 386.2 | 382.5 |
| 45°    | 383.8 | 379.5 | 370.3 | 363.6 | 361.2 |
| 47.5°  | 361.2 | 356.9 | 347.2 | 340.4 | 336.8 |
| 50°    | 337.4 | 334.4 | 325.8 | 317.2 | 314.2 |
| 52.5°  | 314.2 | 309.9 | 302.0 | 295.3 | 291.1 |
| 55°    | 290.4 | 286.7 | 279.4 | 272.1 | 269.0 |
| 57.5°  | 266.6 | 263.6 | 255.6 | 248.3 | 245.8 |
| 60°    | 242.8 | 240.4 | 231.9 | 225.1 | 223.3 |
| 62.5°  | 219.6 | 215.3 | 209.3 | 203.2 | 200.7 |
| 65°    | 195.8 | 192.2 | 186.1 | 180.6 | 177.6 |
| 67.5°  | 171.5 | 168.4 | 162.9 | 158.7 | 156.2 |
| 70°    | 148.9 | 146.4 | 140.9 | 136.6 | 134.3 |
| 72.5°  | 125.7 | 123.3 | 120.2 | 115.9 | 114.1 |
| 75°    | 102.5 | 101.3 | 98.2  | 94.6  | 95.8  |
| 77.5°  | 81.8  | 79.3  | 78.0  | 76.2  | 74.4  |
| 80°    | 61.1  | 60.4  | 59.2  | 57.3  | 56.1  |
| 82.5°  | 41.5  | 41.5  | 40.9  | 38.5  | 38.5  |
| 85°    | 24.9  | 24.4  | 23.8  | 21.9  | 21.4  |
| 87.5°  | 11.0  | 9.8   | 8.6   | 6.8   | 6.1   |
| 90°    | 0.5   | 5.6   | 15.2  | 14.3  | 14.8  |
| 92.5°  | 9.6   | 13.0  | 13.5  | 14.0  | 14.0  |
| 95°    | 22.7  | 27.1  | 27.8  | 27.8  | 27.1  |
| 97.5°  | 37.7  | 41.8  | 43.5  | 43.5  | 43.5  |
| 100°   | 55.2  | 58.8  | 60.0  | 60.0  | 59.5  |
| 102.5° | 73.5  | 76.1  | 77.9  | 78.4  | 77.9  |
| 105°   | 93.6  | 94.8  | 95.8  | 96.5  | 96.5  |
| 107.5° | 113.5 | 115.4 | 115.4 | 115.7 | 113.5 |
| 110°   | 132.8 | 135.3 | 135.3 | 135.3 | 134.0 |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 153.6 | 156.2 | 155.8 | 154.5 | 153.6 |
| 115°   | 174.1 | 176.6 | 175.9 | 175.4 | 174.1 |
| 117.5° | 194.5 | 198.0 | 195.8 | 194.5 | 193.2 |
| 120°   | 215.0 | 218.4 | 215.0 | 215.0 | 213.6 |
| 122.5° | 233.7 | 238.0 | 235.9 | 234.6 | 233.7 |
| 125°   | 253.2 | 257.1 | 255.9 | 254.5 | 254.0 |
| 127.5° | 272.4 | 277.2 | 275.5 | 273.6 | 272.4 |
| 130°   | 290.2 | 295.9 | 295.1 | 294.2 | 292.4 |
| 132.5° | 310.3 | 314.7 | 314.9 | 312.8 | 311.5 |
| 135°   | 327.6 | 332.4 | 333.3 | 332.9 | 331.6 |
| 137.5° | 346.8 | 350.7 | 351.6 | 351.2 | 349.4 |
| 140°   | 363.8 | 367.7 | 369.9 | 369.9 | 368.2 |
| 142.5° | 381.2 | 385.1 | 386.4 | 386.8 | 385.1 |
| 145°   | 397.7 | 400.8 | 403.3 | 403.7 | 402.0 |
| 147.5° | 412.5 | 416.4 | 418.2 | 419.0 | 417.3 |
| 150°   | 427.7 | 430.3 | 432.0 | 433.4 | 432.0 |
| 152.5° | 441.2 | 443.8 | 446.0 | 447.8 | 446.0 |
| 155°   | 454.8 | 456.0 | 457.4 | 459.6 | 458.2 |
| 157.5° | 466.4 | 467.3 | 468.1 | 471.2 | 469.0 |
| 160°   | 476.9 | 477.8 | 478.3 | 480.9 | 479.0 |
| 162.5° | 486.5 | 486.5 | 486.9 | 489.9 | 487.7 |
| 165°   | 494.7 | 494.2 | 494.2 | 497.3 | 495.2 |
| 167.5° | 502.1 | 500.8 | 500.8 | 503.9 | 501.7 |
| 170°   | 507.8 | 506.5 | 506.1 | 509.2 | 506.5 |
| 172.5° | 511.7 | 510.4 | 510.0 | 513.1 | 510.4 |
| 175°   | 514.8 | 513.6 | 512.6 | 515.7 | 513.1 |
| 177.5° | 516.5 | 515.3 | 514.3 | 516.9 | 514.3 |
| 180°   | 515.7 | 515.7 | 515.7 | 515.7 | 515.7 |

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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |       |       |       |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7   | 0.5   | 0.5   | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3   | 0.5   | 0.3   | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2   | 0.2   | 0.2   | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X=2H            | Y=2H | 6.37             | 7.26  | 7.30  | 8.21  | 9.44  | 5.93           | 6.81  | 6.86  | 7.76  | 8.99  |
|                 | 3H   | 8.03             | 8.82  | 8.97  | 9.78  | 11.04 | 7.54           | 8.33  | 8.48  | 9.29  | 10.55 |
|                 | 4H   | 8.61             | 9.37  | 9.57  | 10.33 | 11.59 | 8.12           | 8.87  | 9.08  | 9.84  | 11.10 |
|                 | 6H   | 9.01             | 9.71  | 9.98  | 10.68 | 11.95 | 8.51           | 9.21  | 9.48  | 10.17 | 11.45 |
|                 | 8H   | 9.12             | 9.78  | 10.09 | 10.76 | 12.04 | 8.61           | 9.27  | 9.59  | 10.26 | 11.53 |
|                 | 12H  | 9.16             | 9.79  | 10.15 | 10.77 | 12.07 | 8.65           | 9.28  | 9.64  | 10.26 | 11.56 |
| 4H              | 2H   | 6.83             | 7.58  | 7.79  | 8.55  | 9.81  | 6.48           | 7.23  | 7.44  | 8.19  | 9.45  |
|                 | 3H   | 8.69             | 9.32  | 9.67  | 10.32 | 11.59 | 8.29           | 8.91  | 9.26  | 9.91  | 11.18 |
|                 | 4H   | 9.41             | 9.98  | 10.39 | 10.97 | 12.27 | 8.98           | 9.56  | 9.96  | 10.54 | 11.84 |
|                 | 6H   | 9.92             | 10.41 | 10.91 | 11.42 | 12.72 | 9.48           | 9.98  | 10.48 | 10.99 | 12.29 |
|                 | 8H   | 10.07            | 10.53 | 11.06 | 11.53 | 12.85 | 9.63           | 10.09 | 10.62 | 11.09 | 12.41 |
|                 | 12H  | 10.14            | 10.56 | 11.15 | 11.58 | 12.89 | 9.69           | 10.11 | 10.70 | 11.13 | 12.44 |
| 8H              | 4H   | 9.60             | 10.06 | 10.60 | 11.07 | 12.38 | 9.22           | 9.69  | 10.22 | 10.69 | 12.00 |
|                 | 6H   | 10.23            | 10.61 | 11.25 | 11.66 | 12.97 | 9.84           | 10.22 | 10.86 | 11.27 | 12.58 |
|                 | 8H   | 10.44            | 10.78 | 11.47 | 11.81 | 13.14 | 10.05          | 10.39 | 11.08 | 11.42 | 12.75 |
|                 | 12H  | 10.57            | 10.87 | 11.61 | 11.90 | 13.27 | 10.16          | 10.46 | 11.20 | 11.49 | 12.86 |
| 12H             | 4H   | 9.59             | 10.00 | 10.60 | 11.02 | 12.34 | 9.22           | 9.64  | 10.23 | 10.65 | 11.97 |
|                 | 6H   | 10.26            | 10.59 | 11.28 | 11.63 | 12.95 | 9.88           | 10.22 | 10.91 | 11.25 | 12.58 |
|                 | 8H   | 10.49            | 10.79 | 11.53 | 11.82 | 13.19 | 10.11          | 10.41 | 11.15 | 11.44 | 12.81 |

END OF REPORT